MICROARRAYS TO SCREEN REGULATORY GENES

Abstract of the Invention

Microarray technology allows the multiple parallel processing of information generated from matrices of huge numbers of loci on a solid substrate, which is useful in the gathering of gene signatures defining specific biological states. An approach has been developed to facilitate this process wherein genes of the same regulatory modality are selected. The transcriptional regulation of these genes is related to the same control element. Primers specific for the regulatory genes are selected, based on minimum cross-reactivity with other genes, using known gene data banks. PCR products of selected regions of known genes either binding to this sequence or whose expression is dependent on this binding, as well as genes interacting with the regulatable genes and control genes, referred to as "amplicons" or "gene cDNA fragments" of between about 450 and 1000 nucleotide bases in length, are obtained from a total RNA pool. These amplicons are arrayed on a nylon membrane or other appropriate microchip susbstrate, which is then used as a regulatory gene-specific microarray that is hybridized with sample. Sample will typically be the mRNA obtained from cells associated with a particular state (examples include age or exposure to conditions such as outspace, low gravity), disease (such as cancer or an infection), or disorder (such as a genetic defect or trauma). The transcriptionally regulated profile of regulatory gene-related genes specific to a given cultured cell sample is then determined using a software based analysis of the amount of hybridization which is detected. This information is useful in determining drug targets, markers associated with the disease state (either the presence or absence, or the extent of the disease), or the response of the disease state to drugs or other treatments.